# Quality Assurance as a Managerial Innovation: A Research Perspective

*Arnold D. Kaluzny*

*Quality assurance is defined and concepts from innovation theory are applied to the study of quality assurance programs. Two distinct although not mutually exclusive perspectives on innovation are considered—the diffusion perspective, focusing on the innovation itself and its implementation, and the adoption perspective, highlighting factors characteristic of the adoption unit (i.e., the organization or individuals within it) that facilitate or impede the adoption process. Directions for future research are suggested.*

Quality assurance (QA) has been termed a major innovation in the delivery of health services within the United States [1]. Unfortunately, the relationship between existing theory and research on innovation, and quality assurance activities as an innovation, remains obscure. In some areas of quality assurance the application of innovation theory and research is extremely insightful and provides a useful research agenda to improve our understanding of how QA programs may be effectively implemented. In other areas, the application can be misleading or irrelevant. This ambiguity is a function of the nature of QA activities as well as the state of much innovation theory and research. Both areas suffer from a great deal of contradictory evidence and ideological fervor that often limit their potential for dealing with critical problems facing the health services field.

---

This paper was originally presented at the Invitational Conference on Research in Quality Assurance sponsored jointly by the University of Colorado Health Sciences Center, the Association of University Programs in Health Administration, and the Joint Commission on Accreditation of Hospitals, November 7, 1980 in Denver, Colorado.

Address communications and requests for reprints to Arnold D. Kaluzny, Professor, Department of Health Policy & Administration, School of Public Health, 201 H, University of North Carolina, Chapel Hill, NC 27514.

0017-9124/82/1703-0253/$02.50/0 Health Services Research

The mystique of medical care and the evolving state of management and organizational theory, particularly that branch dealing with innovation, makes imperative a clear definition of terms. For our purpose, quality assurance is defined as those activities and programs intended to assure the quality of care in a defined medical setting. Such programs or activities must include educational or other components intended to remedy identified deficiencies in quality as well as the components necessary to identify such deficiencies and assess the program's own effectiveness.

These activities involve an expanding spectrum of activities relevant to the basic services, production processes, structure, people, and policies of various types of health service organizations. For example, the introduction of quality of care review programs may be seen as directly affecting the production processes as well as involving basic policy decisions of the organization. These activities are often new relative to the organization and always influence or attempt to influence the decision-making processes within the organization. These characteristics make it possible to define quality assurance as a managerial innovation: that is, any program, product, or technique which represents a significant departure from the state of the art at the time it first appears in the organization. This type of innovation tends to affect the nature, location, quality and/or quantity of information that is available in the decision-making process [2].

Following Kimberly [2], two distinct although not mutually exclusive perspectives are relevant to the study of QA activities as a managerial innovation: diffusion perspective and adoption perspective. From each perspective research questions may be generated to aid our understanding of QA programs as innovations in health care management. The purpose of this paper is to (a) examine the concept of innovation from both the diffusion and adoption perspective and identify those areas of theory and research particularly relevant to quality assurance activities and (b) identify future areas of research to facilitate the successful diffusion and implementation of QA programs.

## DIFFUSION PERSPECTIVE

In the diffusion perspective the focus is on the spread of a new object, product or idea among some population of organizations or individuals. This perspective focuses on the study of the innovation itself. It is possible to assess the rate of implementation among a set of organizations or examine the type of organizations adopting various types of QA activities over time. For example, diffusion perspective may assess the rate and type

of organizations incorporating cost effectiveness analysis into the PSRO hospital review mechanisms or the rate and type of organizations implementing new systems of audit like the comprehensive quality assurance system of the American Group Practice Association [3].

While the diffusion perspective has received considerable attention in the health services field in the study of specific technologies and programmatic innovations, its application to quality asurance must be approached with caution. First, while there is great potential to study the diffusion of innovative QA activities, particularly in long-term and ambulatory care facilities [5], many QA activities for inpatient facilities are mandated by the federal government or by the Joint Commission on Accreditation of Hospitals (JCAH). For inpatient QA activity, the classic diffusion perspective provides little insight since implementation is required. The acceptance by personnel and the eventual utilization of information generated by the QA activity in the overall decision-making process of the organization are major concerns of the adoption perspective and will be discussed in a subsequent section of this paper.

A second limitation on applying the diffusion perspective is the newness of the QA activity. While quality assurance may be termed an innovation, in many cases it is simply a relabeling of previous ongoing activities. Relabeling makes it extremely difficult for researchers to define the innovation operationally. Perhaps most important, relabeling reinforces the level of cynicism among organizational personnel who have lived through many so-called "innovations."

Despite these limitations the diffusion perspective helps identify several important areas of QA research: attributes, types of innovations, and patterns of innovations. These areas provide an opportunity to expand our understanding of QA activities and to enhance the current literature on organizations and innovations.

## ATTRIBUTES

A critical concept inherent in the diffusion perspective is the attribute of the innovation itself. The literature has generated an extensive list of attributes to characterize any given innovation [6]. These include, among others, effectiveness, cost, return on investment, risk and uncertainty, compatibility with other aspects of the organization, complexity, perceived relative advantage, and communicability. It is important to distinguish between primary and secondary attributes of the innovation [7].

Primary attributes are those characteristics of the innovation which exist without reference to the specific adopting organization. Thus, for example, a financially well-endowed hospital and an organization with

no endowment might describe a particular QA activity in the same way. Secondary attributes are those characteristics of the innovation that are highly interrelated with particular characteristics of the implementing organization. Thus, for example, a financially well-endowed hospital might classify a particular QA program as relatively inexpensive, while an organization with no endowment may classify the same innovation as prohibitively costly.

Perhaps the most critical attribute relative to QA activities is the effectiveness and cost of the activities. Does the program have an impact on the quality of care provided? At what cost? As stated by the Institute of Medicine (1976) report:

> Despite the potential future accumulation of evaluation data about MCEs (Medical Care Evaluations), today there are no reliable data on the number, topics, and associated cost of currently performing MCEs; the identified deficiencies of patient care; the remedial action proposed and taken; and the extent and duration of improvements in patient care. MCEs may have improved quality but reliable before and after assessments are not available. Any endorsement of the continued performance of MCE must be based on the recognition that in isolated instances performance has improved; the assumption that the questioning and information exchange during conduct of audits may increase attention to quality issues, thereby informally leading to improvements; and the hope that future evaluations will provide more conclusive evidence [8].

Since 1977, there has been progress in the ability to detect problems in the quality and utilization of services [9]. Various assessment methods have been developed and in part evaluated in both inpatient and ambulatory health care settings [9–13]. Yet many questions remain [12]. Which problems respond best to which corrective measures? What problems respond just to exposure? Under what conditions is it more effective to rely on peer review, education, preadmission review, administrative changes, concurrent review or restriction of privileges? All these questions have significant policy implications.

For example, in the area of ambulatory care review the uncertainty that QA activities will have programmatic impact is seen as a primary factor inhibiting the development of such activity among HMOs [5]. Moreover with a few exceptions [15–19], little is known about the ability of QA activities to actually improve the care patients receive [20, 21].

## TYPES OF INNOVATIONS

The diffusion perspective emphasizes the need for greater attention to conceptual distinctions among innovations. For example, Downs and Mohr [7] suggest that a major reason for the inconsistency of research results is that the conditions associated with innovation vary with the type of innovation being considered.

A review of innovation literature in the health services field reveals a distinction frequently made between technological and programmatic innovations. However, the diversity of QA activities as a managerial innovation requires a more refined classification scheme. One such scheme is presented in Figure 1 in which the type of innovation is a function of the extent to which work activities are modified or the ends or goals of such work are altered. *Technological change* occurs when there is a change in means but not a change in ends. For example, the introduc-

Figure 1: Types of Organizational Change

| *Types* | *Means* | *Goals* |
|---|---|---|
| Technical | Changed | Unchanged |
| Adjustment | Unchanged | Changed |
| Adaptation | Changed | Changed |

SOURCE: Adapted from Kaluzny and Veney [22].

tion of a new technology and/or procedure is considered a technological change. *Adjustment change* occurs when the technological means for accomplishing some end remains the same but the goals are changed, e.g., the introduction of non-therapeutic abortion services or a primary care unit in a hospital setting. *Adaptation* occurs when there is a modification in not only the means the organization uses to reach its goal but also in the goals themselves. A classic but rarely observed example of such a change is where a community hospital provides preventive services for the entire community. This typology represents a continuum of risk in which adaptive change is the most extreme—requiring both a modification in structure and values—as opposed to a technical change in which there is little modification of structure or values.

Applying this distinction to QA activities would suggest the following type of classification. Technological change would include many of the innovative methods developed to enhance quality assessment. For example, criteria-setting methodologies such as the Delphi method [23], or the nominal group for problem identification [24], and computer feedback approaches [25] are all examples of more technical QA innovations. Adjustment innovation is illustrated by the use of fairly standard quality assessment methodologies that attempt to achieve new goals within and for the organization. There are few illustrations; however, one example is the QA program being developed by the American College of Radiology [26]. Under this program, systematic attempts have been made to measure the patterns of care provided by radiation therapists in both hospital and non-hospital settings, and to relate these patterns to specific outcome

measures of morbidity, mortality, and quality of life. The inclusion of outcome represents a significant expansion of goals traditionally focused on assuring that the technology was correctly applied—independently of whether it made a difference in health status. In a sense, the quality assurance program represents an opportunity to incorporate technology assessment and use the organization as a laboratory for this activity.

Finally, adaptation includes activities which attempt to affect both the means and goals of the organization. As indicated, these types of innovations are rare; however, the health accounting approach developed by John Williamson [24] illustrates an adjustment change. Under this approach there is not only a change in the means, e.g., use of a nominal group to identify a problem area, but also an attempt to measure the outcomes of care, i.e., broadening the basic goal of the organization.

The above is presented only to illustrate the use of a classification scheme applied to QA activities. It is likely that each type of QA activity will follow a different diffusion pattern and reflect different adoption rates within the organization. While each of these requires examination, specific emphasis needs to be given the diffusion of adjustment and adaptive QA innovations. The study of QA activities provides a significant area in which to analyze the diffusion of these three types of innovations.

## PATTERNS OF INNOVATION

Research on innovation is often characterized by the normal diffusion curve [27]. That is, innovations are accepted slowly at first and then accelerated over time. Yet research from the health services field indicates that the rate at which innovations are implemented among health service organizations differs by type of innovation as well as adopting unit [28, 29]. Building on some classification of QA interventions, it is important to monitor the rate at which various types of QA activities are diffused among different types of adopting units. This information provides an opportunity to contrast diffusion curves with those already available for various programmatic and technological innovations, and to provide useful information to national organizations concerned with the extent to which QA activities are in fact underway throughout the country.

An equally important pattern is the order or sequence in which QA activities are implemented relative to other new programs, products and technologies. Sequence is an extremely important factor. That is, certain types of innovations must be implemented prior to the successful implementation of other types of innovations [30]. The introduction of QA activities may be contingent upon the availability of certain prerequisite resources or more specifically on the successful introduction of significant technological innovations. For example, a QA program at the Harvard

Community Health Plan is based on a highly sophisticated computerized medical record system. Thus the implementation of the plan may be contingent on the diffusion of the computerized medical record system and the subsequent acceptance or adoption of that system as a technological innovation within the organization. Similarly, attention needs to be given to alterations in basic organizational structure that may be a prerequisite to the successful introduction of QA activities or a substitute for such activities. Palmer and Reilly [31] suggest that changing the process of care is not the only or even the best way to improve the institution's quality of care. Changing the process of care may be most cost-effective in the short run; but in the long run, changing the structure of care may prove far more effective.

## ADOPTION PERSPECTIVE

The adoption perspective focuses on the process of bringing a new program, product, or technique into actual use or operation by an organization or individual. Three important questions for the study of QA are generated from this perspective.

- What are the distinguishing characteristics of organizations/individuals successfully implementing quality assurance programs?
- To what extent do individuals within organizations accept quality assurance activities; to what extent does data/information generated by such activities have an effect on decision-making processes within the organization?
- What are the most effective strategies for implementing quality assurance programs, and under what conditions?

Below is a detailed examination of each of these questions as potential areas for quality assurance research.

### DISTINGUISHING CHARACTERISTICS OF INDIVIDUALS/ORGANIZATIONS IMPLEMENTING QUALITY ASSURANCE ACTIVITIES

A great deal of time and energy has been devoted to the identification of factors associated with the implementation of various types of innovations.* Empirical research has focused on the effects of various environ-

*For a detailed review of empirical studies involving programmatic and technological innovations in health services, see Kaluzny [28], Greer [32, 33], Gordon and Fisher [34], and NAS [35].

mental factors [36], structural factors [37, 38], and influence factors, i.e., the effects of values and selected characteristics of elite members of the organization, on the ultimate implementation of innovative activities [39, 40]. Similar research needs to be done on the implementation of QA activities. This analysis will provide an opportunity to test the generalizability of factors already identified as important to implementation and to identify those factors important to the implementation of QA activities.

In addition, it is important to consider innovation as a process involving a series of distinct stages. While there are various models [6] characterizing various stages of the process, for all practical purposes these stages center on the following: recognition of a problem, identification of a solution, implementation and final institutionalization or acceptance by critical actors within the organization. Using this perspective, the objective is to identify the organizational characteristics and attributes of the innovation and their interaction at various stages of the innovation process. Several points require special attention as we attempt to relate this perspective to quality assurance activities.

*Performance Gap.* A critical factor in the implementation process is the perceived discrepancy between how the organization is performing vis-a-vis how certain actors think the organization should be performing. This discrepancy creates a performance gap which when made visible to appropriate individuals within the organization provides a stimulus to initiate corrective action [41]. In other words, the performance gap is the driving force for organizational innovation: it provides the initiative for a search process to identify corrective action and the rationale for ultimate acceptance by organization personnel. Attention needs to be given to identifying factors associated with the development of the performance gap, and to the relationship of the performance gap to subsequent stages of the innovation process.

*Acceptance of the Innovation.* Implementation of an innovation within an organization is not tantamount to acceptance by individuals within that organization. There are many cases where innovations are implemented within the organization and fail to be accepted via attitude or behavior by critical actors within the organization. Acceptance involves various degrees of attitudinal and behavioral change. Degree of acceptance may vary along a continuum ranging from compliance, identification, internalization [42].

Compliance refers to the least amount of acceptance and focuses on behavior change which occurs because the individuals seek rewards or avoid punishment. Identification takes place when the individual imitates another behavior in order to gain approval of someone with whom he wishes to identify. In a sense, this behavior indicates a stronger level of acceptance, and is contingent upon relationship between the individual

and a particular role model. Internalization reflects the highest degree of acceptance. It occurs when an individual perceives an action as relevant and credible so that he or she incorporates the action within his or her own value system and reorganizes perceptions in keeping with the new value behavior. In the case of quality assurance the ultimate occurs when the professional internalizes the activities of the QA program and when data generated by the program are used to affect policy decisions within the organization. This level of acceptance is difficult to achieve [43].

Despite the conceptualization of innovation as a process, research has tended to focus primarily on the implementation stage. With a few exceptions [44, 45], little attention has been given to the analysis of factors affecting the early stages of the innovation process; i.e., recognition of a problem and the identification of a solution to resolve that problem. This area of research is particularly critical to our understanding of QA activities since the implementation of many of the activities is voluntary. Even when mandatory, e.g., JCAH, acceptance by physicians and other health providers within the implementing organization is contingent on the extent to which providers recognize the problems and see the proposed assurance activities as solutions to them. Moreover, attention needs to be given to the relationship between attitudinal and behavioral acceptance and the way in which this affects the use of information generated by the QA program.

Since little research is available, two basic questions should guide research in the areas. (a) Do the same factors that were identified as important determinants of implementation have a similar effect on recognition and identification? (b) If these same factors are identified as important, is the direction of the relationships the same as that recorded for implementation?

A second area of research focuses on the generalizability of factors associated with different types of innovation. Research efforts in both the health services and other areas has tended to support the need for this approach. For example, Nathanson and Morlock [46] distinguish between social and technological innovations and find that hospital conditions favorable to social innovations differ from those conducive to more technological innovations. Similarly, Daft and Becker [47, 48] report that organizational and environmental factors associated with innovation activity in one area of the organization may not be associated with activity in other areas. Specifically, their research on schools reports that there are two distinct processes ongoing within the organization, contingent on whether the innovation is associated with administrative activities or with the more technical aspects of organizational performance.

Similar research needs to be conducted in the quality assurance area. As indicated in our discussion of the diffusion perspective, it is likely that different types of assessment and assurance activities are associated with

varying degrees of risk. Research in other areas suggests that there are different factors within the environment and the organization associated with various types of innovations. Adopting more risky innovations needs to be considered. As Greer [32] suggests in her review of innovation as a field of study—there is little information available on the conditions that are conducive to the adoption of "disruptive, publicly visible or otherwise risky innovations." Moreover, research in the area of quality assurance needs to account for the secondary attributes of the innovation [7]; that is, those attributes of the innovation interacting with the characteristics of the adopting unit.

## UTILIZATION OF INFORMATION

A critical problem facing quality assurance programs is whether the information generated by the program is actually used to influence policy and/or change physician behavior. While the utilization of information is a chronic problem in many organizations, the use of quality assurance information in health service organizations is difficult for two reasons. First, managerial activities in many health service organizations are embryonic or non-existent [49]. Thus while quality assurance mechanisms are mandated and viewed as managerial innovations there is no well-developed subsystem within the organization to track or coordinate this particular innovation.

Even where the managerial activities are well-developed, they are generally "loosely coupled" relative to other functions/activities of the organization [50]. That is, the various activities are tenuously related and while each is somehow "attached," each retains some identity and separateness in that the attachment may be circumscribed, infrequent, weak in mutual effects, unimportant and/or slow in response. Thus while the primary function of the QA mechanism is to control the various activities within the organization, the loose coupling nature of the managerial activities vis-a-vis other activities within the organization limits the ability of quality assurance to affect the ongoing operations of the organization in any systematic way.

Available innovation theory from either the diffusion or adoption perspective has limited utility in addressing these special problems. Emphasis from either perspective is mainly on implementation among or within organizations, and theory often assumes that utilization is a logical consequence of implementation.

To understand this process better we need to focus on other, related theoretical models. Perhaps the most relevant complement to the innovation concept is the growing body of theory and research focusing on the utilization of scientific information [51, 52]. The approach focuses on understanding how people send and receive information, how they make

decisions and solve problems, and how they change and influence each other to change. These questions are generic to clinical decision making [53] and the operations of the QA program.

Moreover, focusing on the utilization of information provides an opportunity to gather important information about the quality assurance process. This can enhance our understanding of the utilization of information in an organizational setting, and direct attention to specific intervention strategies that may assure that information generated by a QA program has a significant impact on the ongoing processes of the organization. Perhaps at the simplest level it is appropriate to conduct a series of case studies to trace how information is in fact used in organizations and to identify barriers to use. This approach will provide the data to develop guidelines to improve existing QA activities.

## IMPLEMENTATION STRATEGIES

Within the adoption perspective, a final area of research is determining the most effective strategies for implementing QA activities. This investigation builds on our understanding of both the determinants of innovation and the identification of factors that facilitate or impede the utilization of information generated by QA activities.

Four basic strategies can be identified: re-education, persuasion, facilitation, and power [54]. Figure 2 provides the respective definitions and illustrative techniques associated with each strategy.

Figure 2: Implementation Strategies

| *Types* | *Definition* | *Illustration* |
|---|---|---|
| Re-education | The unbiased presentation of fact | Continuing education, survey feedback |
| Persuasion | The selling of an idea based on substantive fact or totally false information and/or manipulation of individuals | Successive approximations; avoidance reactance<br>analogy<br>social pressure |
| Facilitative | Activities which make the implementation of a specific change easier | Process consultation, team building, funds |
| Coercion | The use of sanctions and coercion to obtain implementation and subsequent compliance | Joint Commission on Accreditation of Hospitals/ Quality Standards |

SOURCE: Based on Zaltman and Duncan [54].

It is beyond our purpose to discuss specific strategies; however, it is important to emphasize that quality assurance provides a useful opportunity to evaluate the efficacy of various approaches. It allows us to determine the effectiveness of various strategies and the conditions under which each is most effective.

To deal systematically with both requires a change in the way health service managers and providers approach problems. Managers and providers need to shift from advocacy of a specific approach to advocacy of the essential seriousness of the problem [55]. Their political position should be somewhat like the following: "This is a serious problem. We do not know which of these solutions is most effective—but we should initiate action on an experimental basis." By adopting an experimental stance, managers and providers can honestly evaluate results. By recognizing that more than one solution to a problem exists, they may substitute an alternative approach without compromising their position. Their job is to find a solution to a serious problem, to keep trying alternatives until the goal is attained.

This approach perhaps more than any other requires collaboration between program personnel and personnel trained in research/evaluation methodologies. The collaboration will require substantive change in the way both researchers and managers function. For managers, collaboration requires a recognition that they do not know whether a particular program or method of introduction will be effective and/or whether it is even relevant to the many problems faced by their organization. Thus, instead of advocating a particular solution or approach, the manager needs to present solutions as a series of options and develop ways to assess these options as they affect the organization. Similarly, researchers must translate theoretical concerns into practical policy and administrative issues [56, 57].

Attention also needs to be given to the basic design of QA activities and their compatibility with the characteristics of implementing organizations. Shultz and Slevin [58] refer to this compatibility as *organizational validity* or the "fit" between the innovation and the organization. Organizational validity is a multi-dimensional concept and consists of assessing the congruence of a number of factors such as attitudes of users, group dynamics, information flow within organizations, authority structure, previous background and a host of structural design characteristics bearing on the ultimate use of the particular program. The emphasis here is on designing these characteristics to enhance the ultimate acceptability and effectiveness of the program for the adopting organization. This approach has been used to facilitate the implementation of various operations research/management science approaches in industrial organizations, and appears equally appropriate to the design of QA activities

in health service organizations. The extent to which modifications of design enhance adaptability and eventual utilization is an important area of investigation.

## CONCLUSIONS

The purpose of this paper is to examine concepts from innovation theory and the research literature that may better guide research to understand the implementation of quality assurance activities. The available theory and research on innovation provides a good framework for some of the important research issues facing QA programs. Research on quality assurance activities developing from an innovation framework falls into two basic categories: diffusion and adoption perspectives. Each perspective provides a focus for identifying specific research issues. For example, the diffusion perspective highlights the innovation itself and focuses on the pattern of implementation among organizations. The adoption perspective focuses on the organization or the individuals within the organization as the adoption unit and considers factors that facilitate or impede the ultimate implementation, acceptance, and impact of the innovation. Each perspective has a useful role and a rich literature but it is important to keep clear the perspective in use.

Future research needs to focus on designing specific experimental studies to evaluate the effectiveness of QA activities, the conditions under which various types of QA activities have an impact, and the most effective strategies for implementing QA activities in various types of organizations. Type evaluation needs to be an integral part of ongoing quality assurance programs to provide information relevant to the operations of QA programs and to contribute to the ultimate assessment of QA activities.

## NOTES

1. Institute of Medicine. *Assessing Quality of Health Care: An Evaluation.* Washington, DC: National Academy of Science, 1976.
2. Kimberly, J. R. Hospital adoption of innovation: the role of integration into external informational environments. *Journal of Health and Social Behavior* 19:361, 1978.
3. Rubin, L. *Comprehensive Quality Assurance Systems.* Alexandria, VA: American Group Practice Association, 1975.
4. Miller Communication, Inc. Patient Care Evaluation Service. Norwalk, CT (no date).
5. Shapiro, E. et al. *Study of Quality Assurance and Utilization Review Mechanisms in Prepaid Group Practice Plans and Medical Care Foundations.*

Baltimore, MD: The Health Services Research and Development Center, The Johns Hopkins University Press, 1976.
6. Zaltman, G., R. Duncan and J. Holbeck. *Innovations in Organizations.* New York: John Wiley and Sons, 1972.
7. Downs, G. and L. Mohr. Conceptual issues in the study of innovation. *Administrative Science Quarterly* 21:700, 1976.
8. Institute of Medicine. *Assessing Quality in Health Care: An Evaluation.* Washington, D.C.: National Academy of Sciences, November 1976.
9. HFCA. *Health Care Financing Research Report: Professional Standards Review Organization 1979 Program Evaluation,* 1980.
10. Mushlin, A. and F. Appel. *Developing a Quality Assurance Strategy for Primary Care, Final Report.* Baltimore, MD: The Health Services Research and Development Center, The Johns Hopkins University Press, 1978.
11. McAuliffee, W. E. Studies of process-outcome correlation in medical care evaluation: a critique. *Medical Care* 16:907, 1978.
12. Donabedian, A. Methods for deriving criteria for assessing the quality of medical care. *Medical Care Review* 37:653, 1980.
13. Donabedian, A. *The Criteria and Standards of Quality,* Vol. II. Ann Arbor, MI: Health Administration Press, 1982.
14. Goran, M. J. The evolution of the PSRO hospital review system. *Medical Care* 17 (supplemental issue): 1979.
15. Wennberg, J. E. et al. Changes in tonsillectomy rates associated with feedback and review. *Pediatrics* 59:821, 1977.
16. Dyck, F. J. et al. Effect of surveillance on the number of hysterectomies in the province of Saskatchewan. *New England Journal of Medicine* 296:1326, 1977.
17. Deuschle, J. M. Physician performance in a prepaid health plan: results of the peer review program of the Health Insurance Plan of Greater New York. *Medical Care* 20(2):127-142, February 1982.
18. Cohen, D. I. et al. Does cost information availability reduce physician test usage? *Medical Care* 20(3)286-292, March 1982.
19. Brown, C. R. and D. S. Fleisher. The bicycle concept—relating continuing education directly to patient care. *New England Journal of Medicine* 290:88, 1971.
20. Jessee, W. F. Quality assurance systems: why aren't there any? *Quality Assurance Bulletin* 3:16, 1977.
21. Jessee, W. F. Physician competence and compulsory continuing education: are they compatible? *Journal of Community Health* 2:291, 1977.
22. Kaluzny, A. and J. Veney. Types of change and hospital planning strategies. *American Journal of Health Planning* 1:13, 1977.
23. Romm, F. J. and B. Hulka. Developing criteria for quality of care assessment; effects of the Delphi technique. *Health Services Research* 14:309, 1979.
24. Williamson, J. W. *Assessing and Improving Health Care Outcomes: The Health Accounting Approach to Quality Assurance.* Cambridge, MA: Ballinger, 1978.
25. McDonald, C. J. et al. Physician response to computer reminders. *Journal of the American Medical Association* 244:1579, 1980.
26. Kramer, S. The study of the patterns of cancer care in radiation therapy. *Cancer* 39:1977.
27. Rogers, E. and F. Shoemaker. *Communication of Innovation: A Cross-Cultural Approach.* New York: Free Press, 1971.
28. Kaluzny, A. Innovations in health services: theoretical framework and review of research. *Health Services Research* 9:101, 1974.

29. Warner, K. A "desperation-reaction" model of medical diffusion. *Health Services Research* 10:369, 1975.
30. Kaluzny, A. et al. Scalability of health services: an empirical test. *Health Services Research* 6:214, 1971.
31. Palmer, R. H. and M. C. Reilly. Individual and institutional variables which may serve as indicators of quality of medical care. *Medical Care* 17:693, 1979.
32. Greer, A. L. Advances in the study of diffusion of innovation in health care organizations. *Milbank Memorial Fund Quarterly/Health and Society* 55:505, 1977.
33. Greer, A. L. Technology, assessment, diffusion and implementation. *Journal of Medical Systems* 5(1), 1981.
34. Gordon, G. and G. Fisher (eds.). *The Diffusion of Medical Technology: Policy and Research Planning Perspective.* Cambridge, MA: Ballinger, 1975.
35. National Academy of Sciences. *Medical Technology and the Health Care System.* A Report by the Committee on Technology and Health Care, Assembly of Engineering, National Research Council and Institute of Medicine, Washington, DC, 1979.
36. Russell, L. *Technology in Hospitals.* Washington, DC: The Brookings Institute, 1979.
37. Hage, J. and M. Aiken. Program change and organizational properties. *American Journal of Sociology* 72:503, 1967.
38. Moch, M. K. and E. V. Morse. Size, centralization and organizational adoption of innovations. *American Sociological Review* 42:716, 1977.
39. Hage, J. and R. Dewar. The prediction of organizational performance: the case of program innovation. *Administrative Science Quarterly* 18:279, 1973.
40. Kimberly, J. R. The Diffusion, Adoption and Effectiveness of Managerial Innovation. In P. C. Nystrom and W. H. Starbuck (eds.), *Handbook of Organizational Design.* Vol. 1. New York: Oxford University Press, 1980.
41. Downs, A. *Inside Bureaucracy.* Boston, MA: Little Brown, 1967.
42. Kelman, H. Compliance, identification and internalization—three processes of attitude change. *Journal of Conflict Resolution* 2:51, 1958.
43. Osborne, C. E. Relationship between medical audit results and the planning of continuing education programs. *Medical Care* 18:994, 1980.
44. Aiken, M., S. Bacharach, and J. French. Organizational structure, work process and proposal making in administrative bureaucracies. *Academy of Management Journal* 23:631, 1980.
45. Hernandez, R. and A. Kaluzny. Determinants of Program Initiation: The First Stage of the Innovation Process. Paper presented at the American Sociological Association Meeting, New York, August 1980.
46. Nathanson, C. and L. Morlock. Control structure, values and innovation: a comparative study of hospitals. *Journal of Health and Social Behavior* 21:315, 1980.
47. Daft, R. L. A dual-core model of organizational innovation. *Academy of Management Journal* 21:193, 1978.
48. Daft, R. and S. Becker. *The Innovative Organization.* New York: Elsevier, 1975.
49. Katz, D. and R. Kahn. *The Social Psychology of Organizations,* 2nd Ed. New York: John Wiley and Sons, 1978.
50. Weick, K. E. Educational organizations as loosely coupled systems. *Administrative Science Quarterly* 21:1, 1976.
51. Havelock, R. G. Research on the Utilization of Knowledge. In M. Kochen (ed.), *Information for Action: Reorganizing Knowledge for Wisdom.* New York: Academic Press, 1975.

52. Havelock, R. G. What do we know from research about the process of research utilization? *CRUSK* 1974.
53. Koran, L. The reliability of clinical methods, data and judgments. *New England Journal of Medicine* 293:642, 695, 1975.
54. Zaltman, G. and R. Duncan. *Strategies for Planned Change.* New York: Wiley-Interscience, 1977.
55. Campbell, D. T. Reforms as experiments. *American Psychologist* 24:409, 1969.
56. Shortell, S. Organizational theory and health services delivery. In S. Shortell and M. Brown (eds.), *Organizational Research in Hospitals.* Chicago: Blue Cross Association, 1976.
57. Mintzberg, H. The manager's job: folklore and fact. *Harvard Business Review* 49, July/August 1975.
58. Schultz, R. L. and D. P. Slevin. A Program of Research on Implementation. In R. L. Schultz and D. Slevin (eds.), *Implementing Operations Research/ Management Science.* New York: American Elsevier Publishing, Inc., 1975.